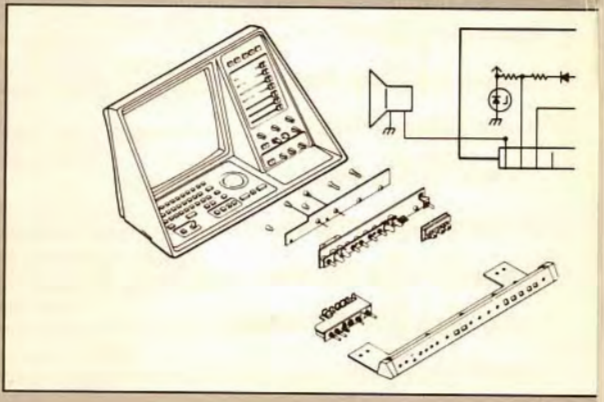
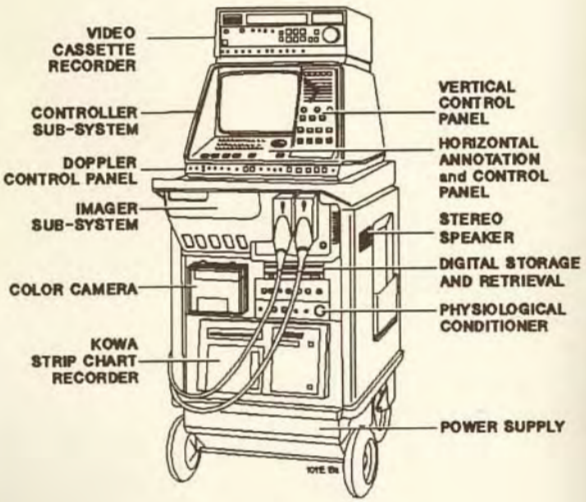
DAVID MEADE

HEWLETT® PACKARD

77025A/30A/35A/40A
77020CV

Quick Reference Service Guide





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ERROR CODE MODULES AND INTERACTIVE TESTS

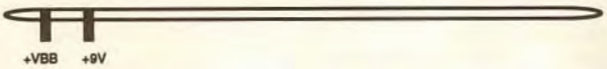
Error	Module/Board	Slot	Test	Time
Controller			**E1**	0:10
C01	Processor	A1	E1 1	
C02	Memory Clock	A2	E1 2	
C03	VCR/Physio	A3	E1 3	
C04	Control panel	A4	E1 4	
C05	TM/Frame	A5	E1 5	
C06	Analog I/O	A6	E1 6	
Scan Converter			**E3**	~14:00
D01	Proc Graphics (Proc)	C1	E3 1	
D02	PVT (Timing)	C5	E3 2	
D03	Image Memory	C7	E3 3	
D04	PVT (Video)	C5	E3 4	
D05	Proc Graphics (Grap)	C1	E3 5	
D06	R-theta	C9	E3 6	
D07	Video I/O	C4	E3 7	
D08	Scanner I/O	C14	E3 8	
D09	B&W CLR	C2	E3 9	
D0A	Color CLR	C3	E3 A	
D0B	Flow Proc	C11	E3 B	
D0C	Dop Proc	C13	E3 C	
D0D	AQ (ABD)	C8	E3 D	
D0E	DSR-SCSI	C12	E3 E	
Scanner			**E2**	4:00
E02	Dig Control	B14	E2 2	
E03	Xmit Power Sply	A8	E2 3	
E04	Image Det	A13	E2 4	
E05	TGC	B13	E2 5	
E06	CD	A2-7	E2 6	
E07	FE, FD, Distr	B1-12,15	E2 7	
E08	FE	B3-10	E2 8	
E09	Dop Detector	A12	E2 9	
Extended Basic			**E0 3**	~20:00
Rev. N board ID screen			E0 5	
Reset Configuration (clear CMOS)*			E0 7*	
HPIB cable test			E0 6	
System config. summary			E0 2	
Analysis config. summary			E0 8	
Dot test - 64 & 128			E0 32	
Dot test - 288			E0 33&34	
Convergence grid			E3 7 12	
Full white screen			E3 7 14	
White centered rectangle			E3 7 15	
Gray wedge, 64 gray levels			E3 7 16	
8 color bars			E3 7 17	
Full red screen			E3 7 19	
Full green screen			E3 7 1A	
Full blue screen			E3 7 1B	

* CAUTION! E07 Completely resets customers configuration and analysis.

IMAGER BOX TEST POINTS

SETUP: - Only one transducer connected:
21200C/21202A: 2.5 MHz or
21258A: 7.5 MHz.
- Mode — 2D (Doppler off, Color off)
- Depth — Maximum

Board	Label	Voltage*
Coarse Delays	+VBB	+3.5V
	+9V	Normally +8.3V



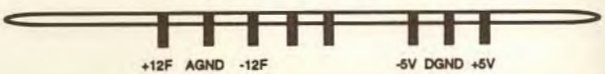
Transmit Supply	AGND	0V
	Q1C 2.5MHz;	–15V to –195V/–160V**
	7.5MHz;	–15V to –86V**
	VCC	+5V
	–5.2	–5V
	+10V	+10V
	–13V	Normally –13.5V
	VH 2.5MHz;	–2.5V to –155V/–125V**
	7.5MHz;	–2.5V to –57V**
	DRL	–13V
	DRR	–13V
	+3A	+3V

** Varying Transmit control. Larger maximum voltage is with 77101A, smaller with Tectrol.

PV Supply	GND	0V
	VPP	+43V
	VDD	+10V
	VNNB	–103V or –140V+
	VNNA	–103V or –140V+
	PV-INT	+5V
	DIS-BIAS	–87V or –135V+

+ Depending on transducer and power supply.

Video I/O	+12F	+12V
	AGND	0V
	–12F	–12V
	–5V	–5V
	DGND	0V
	+5V	+5V

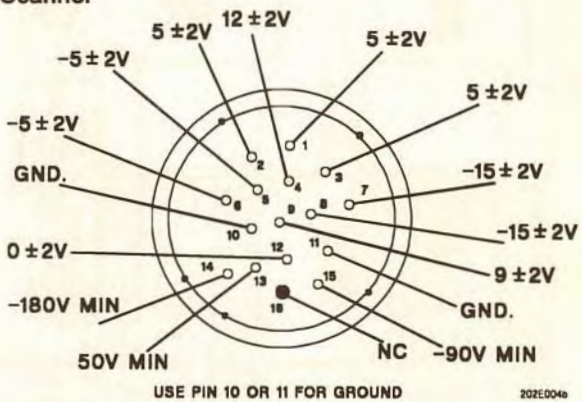


* The voltages measured should be close to those listed. If they are significantly different, there is a power supply problem.

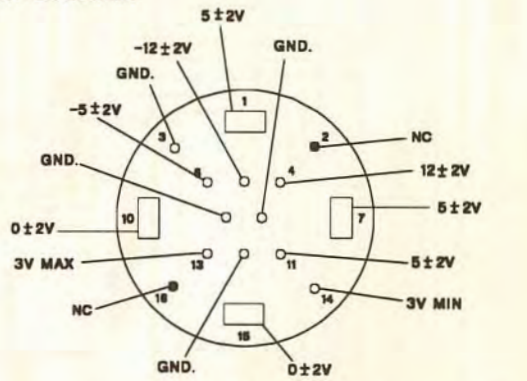
TECTROL UNLOADED (DISCONNECTED) POWER CABLE VOLTAGES

Disconnect BOTH cables when testing either one.

Scanner



Scan Converter



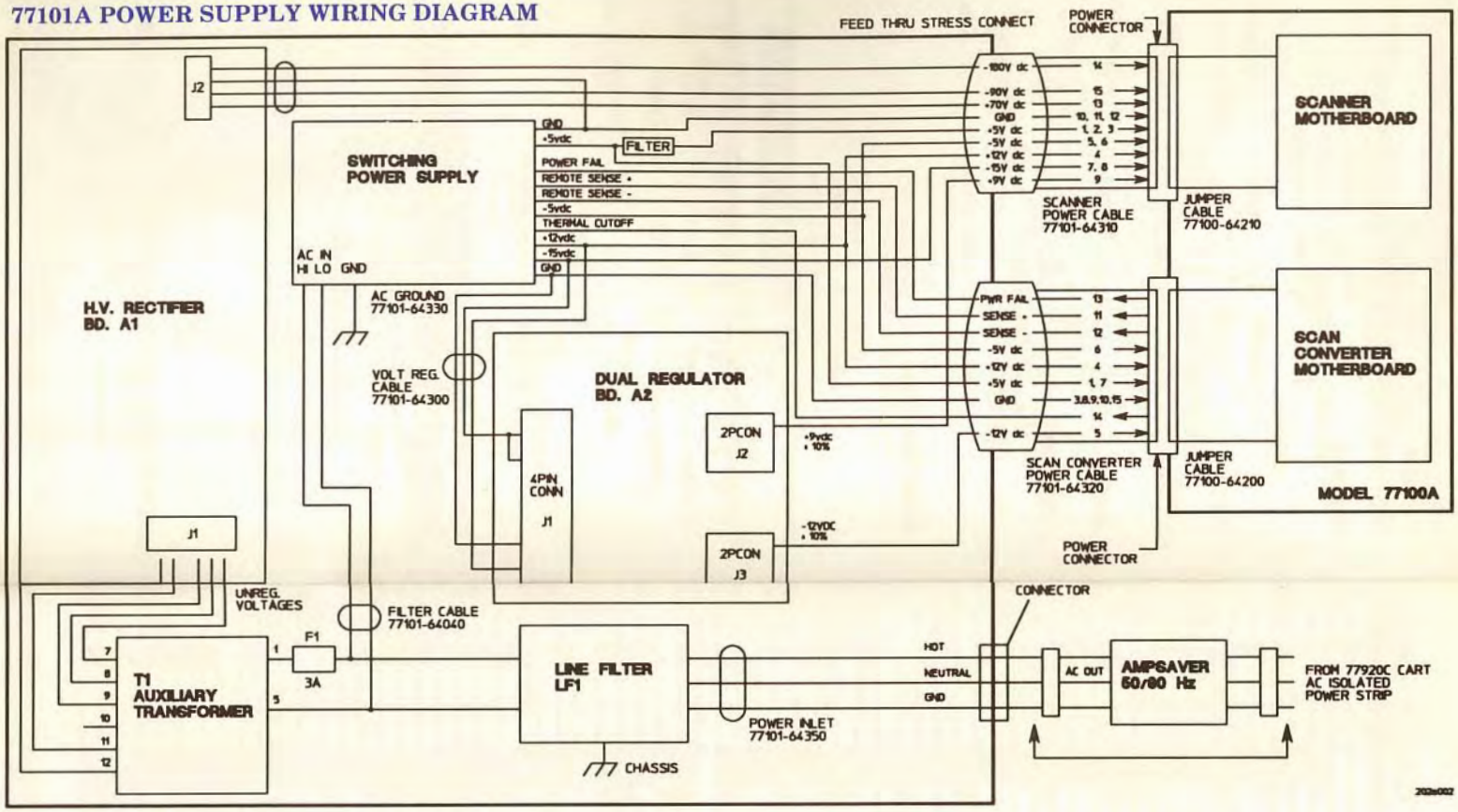
TECTROL TEST CONNECTOR VOLTAGES

Scanner and Scan Converter power cables must be connected.

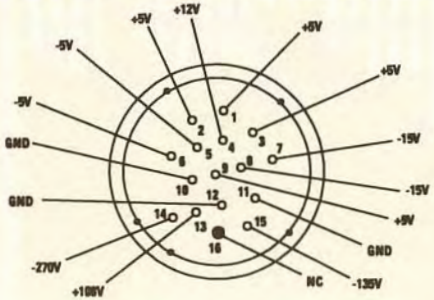
1	2	3	4	5	6	7
8	9	10	11	12	13	14

1	–180V
2	–90V
3	+50V
4	GND
5	+12V
6	+9V
7	–12V
8	No Connection
9	–5.3V
10	0V (Scanner +5 return)
11	+5V (Scanner)
12	+5V (Scan Converter)
13	0V (Scan Converter +5 return)
14	–15.2V

77101A POWER SUPPLY WIRING DIAGRAM



77101A SCANNER POWER CABLE UNLOADED (DISCONNECTED) VOLTAGES



- CABLE SIDE - PIN SIDE VIEW
- VOLTAGES MAY VARY BY 5%
- GROUND VOLTMETER ON POWER SUPPLY CHASSIS

NOTE: SCAN CONVERTER POWER CABLE VOLTAGES CANNOT BE MEASURED UNLOADED BECAUSE SENSE LINES ARE DISCONNECTED.

202e004

PC BOARD INFORMATION

New/Exchange Part #	Minimum Date Code	Rev. L hw (CX systems) M.4 / M.5 sw	Rev. M hw (CVL, C, VL systems) M.4 / M.5 sw	Rev. N.0	Rev. N.1	Rev. N.3	Rev. O.0	Rev. O.1/ O.3/O.4
77100-60100 Scanner Mother		■						
77100-60120 Scanner Mother		■						
77100-60130 Scanner Mother	3002	■	■	■	■	■	■	■
77100-60200/8 Distribution	2905	■						
77100-60210/8 Distribution	3002	■ need bail	■	■	■	■	■	■
77100-60300/8 Front End	2905	■	■	■	■	■	■	■
77100-60400/8 Fine Delay	3034	■						
77100-60410/8 Fine Delay	3034		■	■	■	■	■	
77100-60440/8 Fine Delay	3219	T (M.4 only)	T (M.4 only)			T	T	■
77100-60500/8 200ns Coarse Delay	2952	■						
77100-60510/8 100ns Coarse Delay	2952	■						
77100-60520/8 200ns Coarse Delay	2944		■	■	■	■	■	■
77100-60530/8 100ns Coarse Delay	2944		■	■	■	■	■	■
77100-60540/8 Flat tap Coarse Delay	2944	■	■	■	■	■	■	■
77100-60600/8 Image Detector	3102	■						
77100-60610/8 Image Detector	3102	■	■					
77100-60620 Image Detector	3109			■				
77100-60630 Image Detector	3137	■	■ (if 21255)					
77100-60640 Image Detector	3124	T (M.4 only)			■	■	■	■
77100-60880/8 Digital Control	3040	■	■					
77100-60830/8 Digital Control	3108			■	■	■	■	■
77100-60900/8 TGC	3310	■						
77100-60910/8 TGC	3310		■					
77100-60930/8 TGC	3310		T (M.4 only)	■	■	■	■	■
77100-61010/8 Xmit Power Supply	3020	■ (M.4 only)						
77100-61020/8 Xmit Power Supply	3019	■ (M.4 only)	■ (M.4 only)					
77100-61030/8 Xmit Power Supply	3104	■ (M.4 only)		■	■			
77100-61040/8 Xmit Power Supply	3218	■ (T for M.4)	■ (T for M.4)	T	T	■	■	■
77100-61100/8 Doppler Detector	3107	■	■					
77100-61110/8 Doppler Detector	3139	T (M.4 only)		■	■	■		
77100-61180/8 Doppler Detector	3230	T (M.4 only)					■	■
77100-61200 PV Power Supply	3018		■		■	■	■	■
77100-61210/8 PV/Omni Power Supply	3239		■	■	■	■	■	■
77100-65000 Scan Converter Mother		■	■					
77100-65010 Scan Converter Mother	3050	■	■	■	■	■	■	■
77100-65110/8 Scanner I/O	3107*		■	■	■	■	■	■
77100-65120/8 Scanner I/O	2952	■						
77100-65200/8 Doppler Processor	2929	■	■	■	■			
77100-65210/8 Doppler Processor	3143	■	■	■	■	■	■	■
77100-65310/8 DSR-SCSI	3140					■	■	■
77100-65410/8 Flow Processor	2952	■	■					
77100-65420/8 Flow Processor	3113	T (M.4 only)		■	■	■	■	
77100-65430/8 Flow Processor	3219	T (M.4 only)	T (M.4 only)			T	T	■
77100-65500/8 R-Theta	3018	■	■	■	■	■	■	■
77100-65610/8 Image Memory	2906	■	■	■	■	■	■	■
77100-65700/8 PVT	2914	■	■	■	■	■	■	■
77100-65800/8 B&W CLR	2914	■	■	■	■	■	■	■
77100-65900/8 Color CLR	2914	■	■	■	■	■	■	■
77100-66000/8 Video I/O	3024	■	■	■	■	■	■	■
77100-66010/8 Video I/O NTSC	3312	■	■	■	■	■	■	■
77100-66020/8 Video I/O PAL	3312	■	■	■	■	■	■	■
77100-66100/8 Processor Graphics	3003	■	■					
77100-66120/8 Processor Graphics	3104	T	T	■	■			
77100-66130/8 Processor Graphics	3140					■	■	■
77100-66200/8 AQ (ABD)	3107				■	■	■	
77100-66240/8 AQ (AWAMS)	3232						T	■
77100-67100 Backend I/O	3030	■	■					
77100-67110 Backend I/O	3113			■	■	■	■	■
77120-61130/8 Audio	2446	■	■	■	■	■	■	■
77120-61210 Controller Mother	3152	■	■	■	■	■	■	■
77120-62140/8 Controller Processor	3025	■	■	■	■	■	■	■
77120-63300/8 VCR/Physio	2208	■ need -64420	■	■	■	■	■	■
77120-63410/8 TM/Frame	2437	■	■	■	■	■	■	■
77120-64220/8 Analog I/O	2615	■	■	■	■	■	■	■
77120-64420/8 Memory/Clock	3013	■ need -62140	■	■	■	■	■	■

■ = Can put this board in this system

T = Can use this board for troubleshooting dead systems, but not IQ problems. Must NOT be left in system.

* = Raw board must be Rev. A or B without heat sinks on U915 and U908, or Rev. C.

SYSTEM SWITCH SETTINGS

Controller Processor board

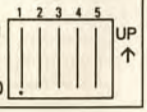
Switch #	Function	Open/Closed (0/1)
1	Reserved	Normal/Factory test
2	VCR/Physio	Present/Absent
3	TM/Frame	Present/Absent
4	Analog I/O	Present/Absent
5	B/W Printer **	Absent/Present
6	Ignored if 5 closed	Honeywell/Kowa
7	Reserved	Normal/Factory test
8	LED reset	Normal/No reset*

* When 8 closed and Imager hangs, Controller will not reset Imager. Useful for troubleshooting hangs.

** Interactive menu always displays "Mitsubishi".

VCR/Physio board

Switch #	Function	1/0 (Up/Down)
1,2,3	AG-6300,NTSC	0,1,0
1,2,3	AG-6200E,CCIR	0,0,1
1,2,3	AG-7300/7330/ 7350	0,0,0
4,5	Mem/Clk -62410 & higher	1,0

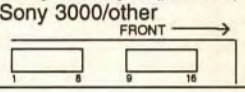


Toggle switches

Board	Function	Fwd/Back
TGC	TV format	PAL/NTSC
Digital Control	Rev L,M Proc.Speed	Full/Half
Scanner I/O	Clock	Scan Conv./Sys.

Processor Graphics board

Switch #	Rev.	Function	On/Off (Up/Down)
1		TV Format	PAL/NTSC
2		Reserved	Factory test/Normal
3	M.0/.1 L,M.2/.3	PV Not used	PV/PV+Cardiac
4		Peripheral	Aspect or Matrix/Sony or none
5		Peripheral	Aspect or Sony 5000/ Matrix or Sony 3000
6		Reserved	Factory test/Normal
7		Reserved	Factory test/Normal
8	pre-N N	Reserved ROM size	Factory test/Normal 4Mbyte/1Mbyte (pre-O.1)
9	N	Peripheral	Sony 3000/other
10-16		unused	



Video I/O Board

Switch #	Function	Open/Closed (Down/Up)
1	Bkgrd level on tape	Grey/Normal
2	Loopback	Loopback/Normal
3	Color Burst	Enabled/Normal
4	Camera Port	Color/B/W (Normal)
5	RGB Aux Port chngd to Betacam	Betacam/Normal
6	RGB Aux Port chngd to Sync on Green	Sync on green/Normal
7	RGB Aux video Levels	.7Vp-p/1Vp-p (Normal)
8	RGB Int. Video Levels	.7Vp-p/1Vp-p (Normal)

PERIPHERAL SWITCH SETTINGS

Mitsubishi Printer 77570A/B:

Paper:	Super
Input Level:	Max (cw)
Lines:	525(60Hz) or 625(50Hz)
Impedance:	High
Picture:	Detent (Center)
Dip Switches:	All Off (Down)

Kowa Recorder 77510A:

Configuration: Press period key while cycle power.
60Hz video (U.S.): P - 0 1 1
50Hz video (Eur.): P - 0 2 2 or 0 1 2

Errors:

H:	Thermal head overheated.
PS:	System speed set for 10 mm/sec.
E:	Test switch set for T on back of recorder.
J:	Paper jammed.
UP:	Thermal head positioned incorrectly.

Sony Printer Color UP-5000/5200 77550/77555A/B:
75 OHMS (INPUT): OFF; AGC: OFF

Sony Printer Color UP-3000 77530/535A:
SW1 DIP switches: All OFF (down) except 4, 5 & 6 ON.

Sony Printer Color UP-1850 77530/535B:
DIP switches: All OFF (down) except 3, 4, 5 & 6 ON.

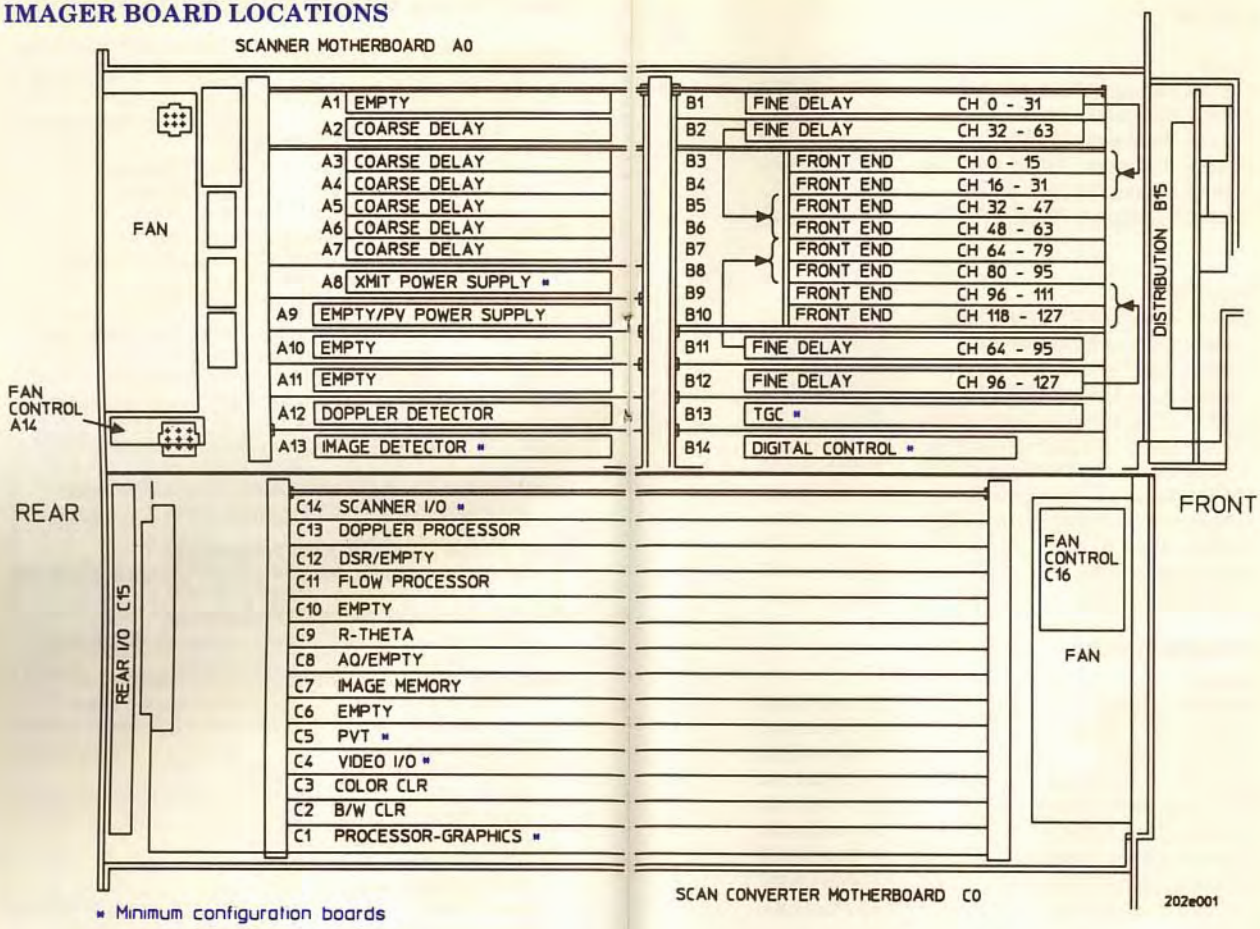
Panasonic VCRs AG6300/6200/7300/7330/7350

YC Filter (Notch):	ON for Composite video OFF for S-VHS video
Controller Select:	1
Audio CH2 Select:	AUDIO
Mode Lock:	OFF
Auto Backspace:	ON
Video Sensor Rec:	OFF
CH2 Meter:	CH2
Audio Limiter:	OFF
Input Select:	Line for Composite, 6200/6300 S-Video for S-VHS video
S-VHS:	ON for S-VHS
Audio Dub:	CH1-CH2
Audio monitor:	MIX
Dolby NR:	OFF
Video Mode:	AUTO
Tape Remain:	NORM
Edit:	OFF
Tracking, slow tracking:	Set to Detent
Picture:	Set to Mid-range
TV/VCR:	Any
Video Out Select:	NORM
Sync:	INT
Ext Timer Rec:	OFF
Audio Monitor Meter:	NORM
Audio Out:	NORM
Hi-Fi Rec:	OFF
TV System:	PAL or NTSC

Sony PrinterB/W UP-860 77560/565A:
DIP switches: 1 OFF (up), all others ON
Gamma: middle.
Dadj (NTSC) or Densite (PAL): Middle

Sony Printer B/W UP-910 77580/585A:
DIP switches: All OFF
75 ohms: ON

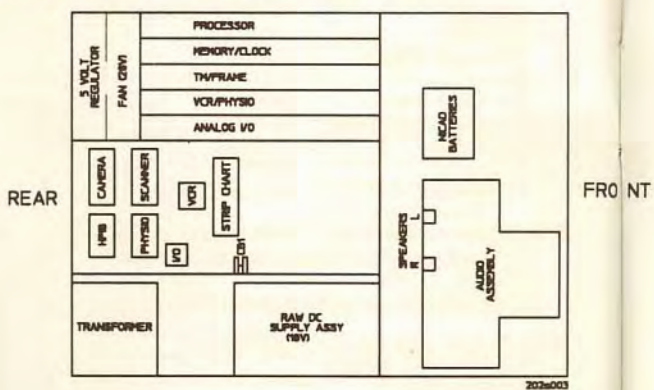
IMAGER BOARD LOCATIONS



* Minimum configuration boards

To make a 64 channel system:
The following slots should be empty: A2, A3, A4, B1, B3, B4, B9, B10, B12.
The following slots should contain 200ns Coarse Delay boards: A5, A6, A7.

CONTROLLER BOARD LOCATIONS



PARTS

VCRS

77611A Panasonic 6300 NTSC	77611-68000
77621A Panasonic 6300E PAL	77621-68000
77612A Panasonic 7300 NTSC	77612-68000
77622A Panasonic 7330E PAL	77622-68000
77613A Panasonic 7350 NTSC	77613-68000
77623A Panasonic 7350E PAL	77623-68000

PRINTERS

77560A Sony UP870 B/W NTSC	77560-68000
77565A Sony UP860 B/W PAL	77565-68000
77580A Sony UP910 B/W NTSC	77580-68000
77585A Sony UP910P B/W PAL	77585-68000
77530A Sony UP3000 Color NTSC	77530-68000
77535A Sony UP3000P Color PAL	77535-68000
77530B Sony UP1850 Color NTSC	77530-68100
77535B Sony UP1850 Color PAL	77535-68100
77550B Sony UP5200 Color NTSC	77550-68001
77523A Aspect/100V	77523-68000/1
77570A Mitsubishi	77570-68000
77570B Mitsubishi	77570-68200

TRANSDUCERS

Sector

21200C 2.5MHz	21200-68200
21202A 2/2.5 MHz	21202-68000
21205C 3.5MHz	21205-68200
21210B 5.0MHz Med.	21210-68100
21211B 5.0MHz Short	21211-68100
21242A 3.5/2.7 MHz	21242-68000
21244A 3.5MHz Wide	21244-68000
21246A 5.0MHz Wide	21246-68000
21275A 7.5/5.5MHz	21275-68000

Linear

21253A 3.5MHz CLA	21253-68000
21254A 4.5MHz, 64 aperature	21254-68000
21255A 4.5MHz	21255-68000
21255B 4.5/3.5MHz Trap	21255-68100
21257A 7.5MHz, 64 aperature	21257-68000
21258A 7.5MHz	21258-68000
21258B 7.5/5.5MHz Trap	21258-68100
Standoff	21286-60060
Standoff refill	21286-60020

TEE

21362A 5.0MHz TEE	21362-68000
21362C 5.0MHz with CW	21362-68200
21363A 5.0MHz Biplane	21363-68000
21364A 5.0/3.7MHz Omni	21364-68000
21365A 5.0MHz Mini	21365-68000
21366A 7.5/5.5MHz Biplane Ped.	21366-68000

Non-imaging

21221A 1.9MHz	21221-60061
21223A 5MHz CW	21223-60060
21228A 1.9MHz PW TCD	21228-60060

PERIPHERAL SUPPLIES

77570A/B Mitsubishi paper	40458A
Mitsubishi Cleaning Sheet	40458AK
77530A Color Thermal printer paper	13993A
77535A Color Thermal printer paper	13994A
77550/555A Color Thermal printer paper	13991A
77550/555A B/W Thermal paper	13992A
77560/565A B/W Printer Paper (small)	M2236A
77560/565A Cleaning Sheet	243049501-SON
77580/585A B/W Printer Paper (large)	M2237A
77580/585A Cleaning Sheet	373486901-SON
77510A Kowa Thermal paper	40479A
77500B/C Honeywell paper	9270-0983
77523A Aspect film 30/10 boxes	40486A/B
Aquasonic gel 12 small/1 large bottle	40483A/B
VHS T120 Maxell 1 tape/case	13920A/B
S-VHS SQ-T120 1 tape/case	13921A/B
Blank optical disk	92279A
TEE Sheath kits (10)	40487A/E
Bite guards	M1828A

SOFTWARE KITS

(X = 0 English, 1 French, 2 German, 4 Italian)

M.5	77030-6039X	Colorization, Autocool
N.1	77030-6054X	AQ
N.3	77030-6055X	LGC, OR, Pan 7350, E02/8, Maxcap, DSR
O.0	77030-6056X	Doppler improvements
O.1	77030-6060X	AQ Vol. and Dataport, Vasc. Prod.
O.3	77030-6064X	Trapezoidal Transducers
O.4	77030-6067X	Pediatric Biplane

MISCELLANEOUS PARTS

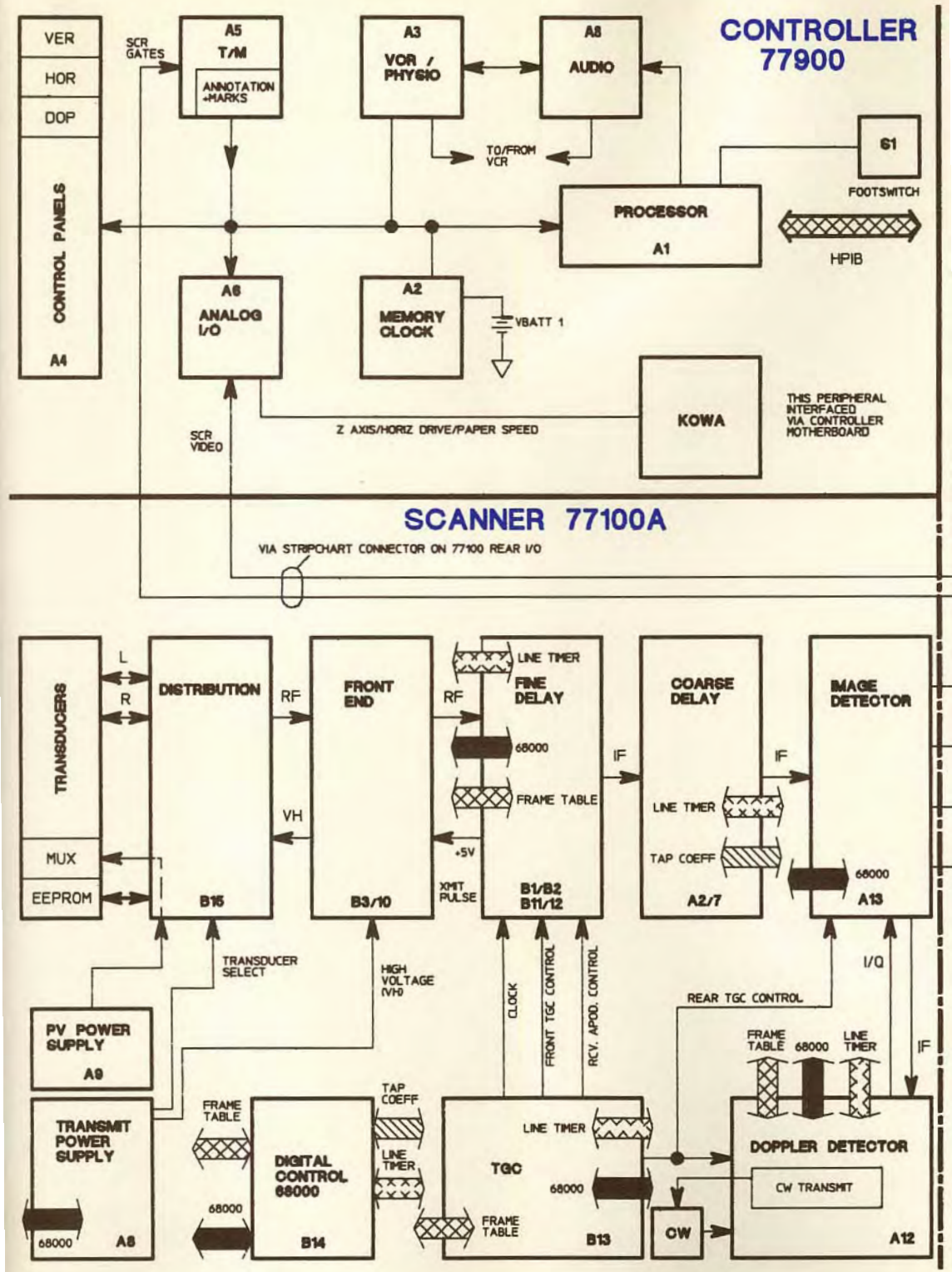
Balloon tire upgrade	77920-64030
Filter kit	77030-60007
Trackball	0950-1759
Battery (S.C. Motherboard) holder kit	77100-66070
Battery (S.C. Motherboard)	1420-0364
Battery (Controller)	77120-60010
TEE OR ECG cable (round)	77020-60300
ECG cable (US)	M1580A
ECG cable (EUR)	M1590A
ECG leads (US)	M1603A
ECG leads (EUR)	M1613A
Horizontal keyboard top row keys kit	77120-40900
TEE Care Card	21364-99740
Transistor plate assy < N.3	77100-62130
Transistor plate assy ≥ N.3	77100-62250
VCR Internal cable	77100-64240
Transformer circuit breaker cable assy	77920-64350
Tectrol exchange	77101-68100
Tectrol upgrade kit	77101-65000

77101A PARTS

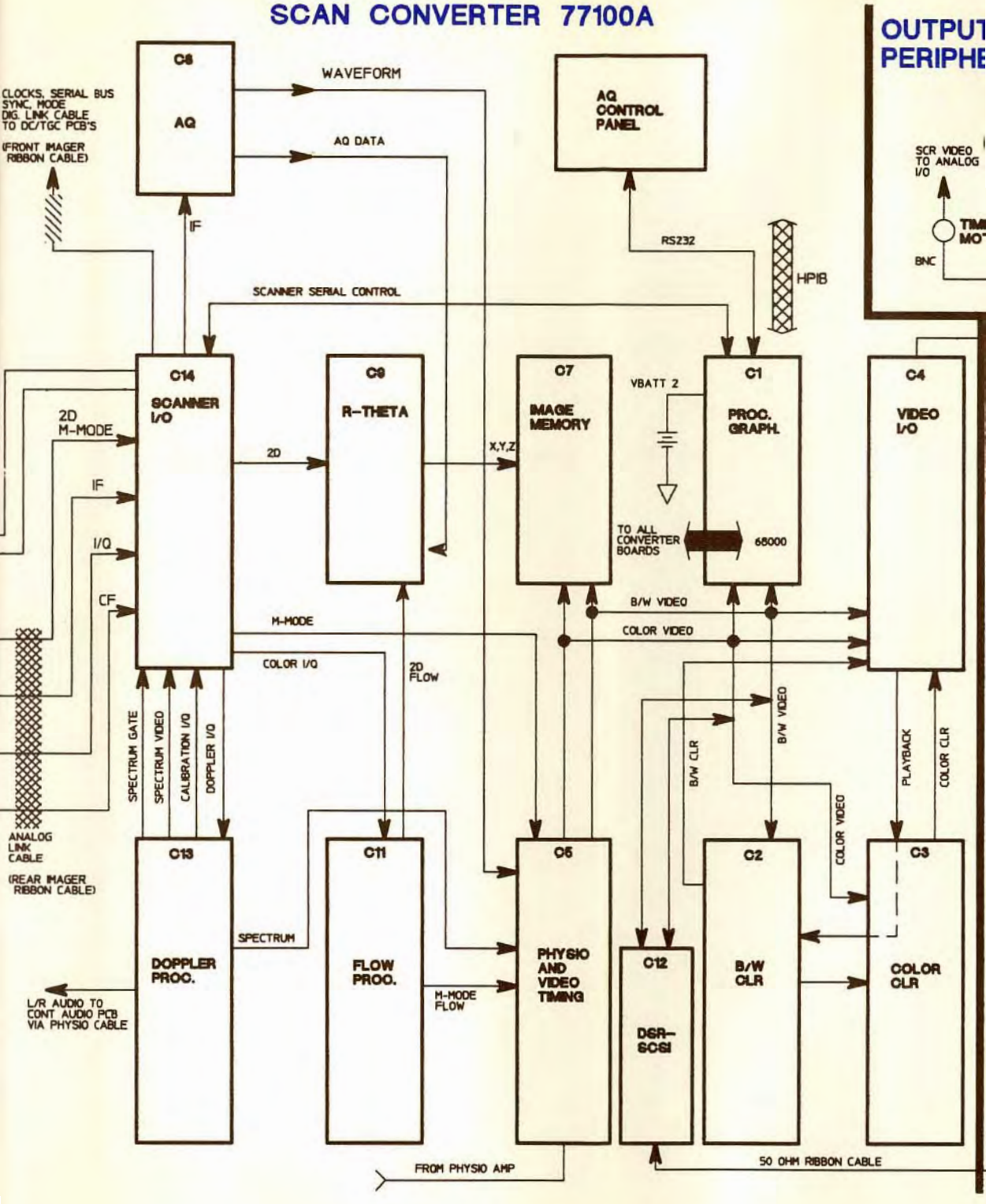
H.V. Rectifier board A1	77101-68010
Auxiliary Transformer T1	77101-60010
Line Filter LF1	9135-0399
Dual regulator board A2	77101-68020
Ampsaver	77920-81011

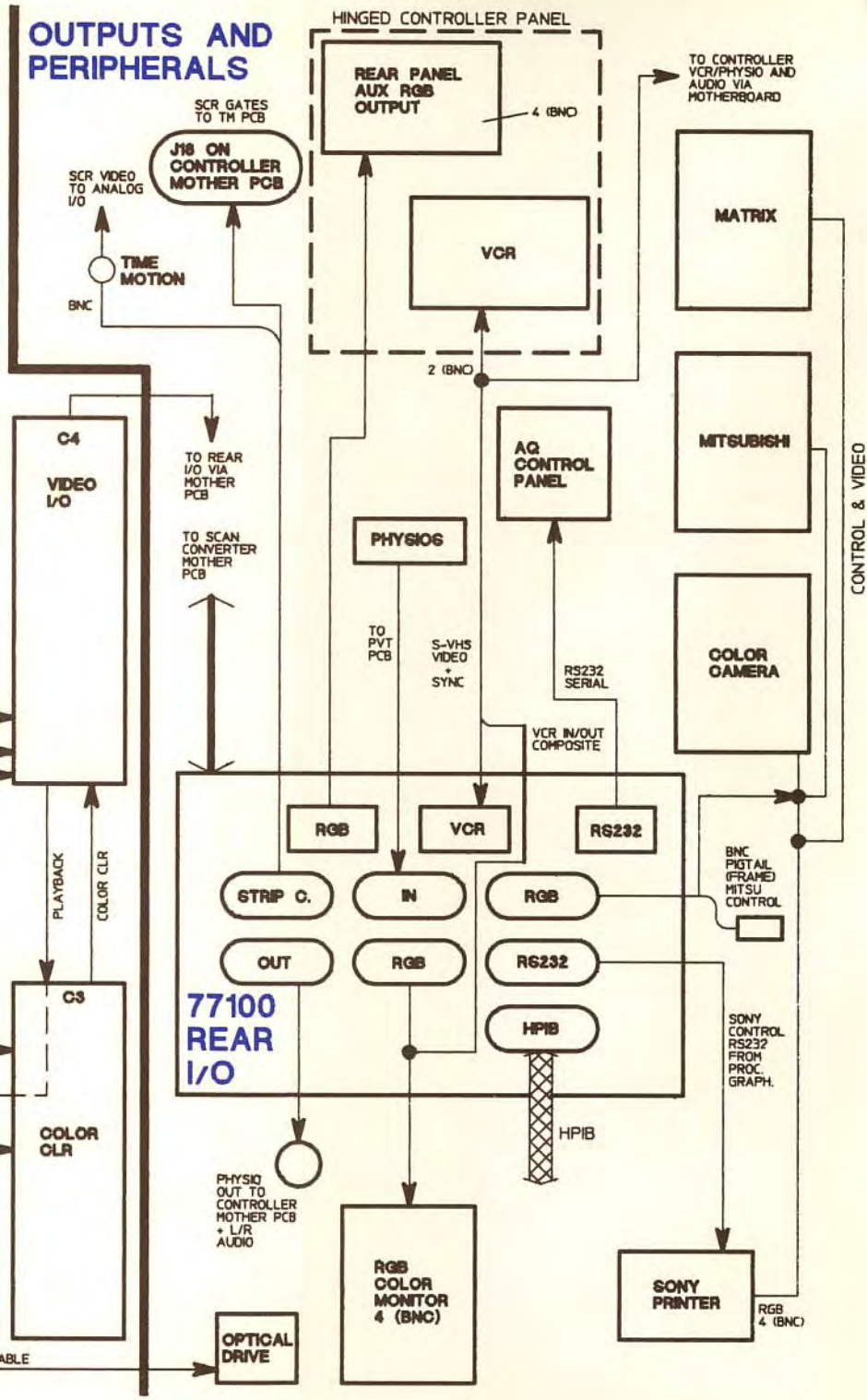
CIRCUIT BREAKERS

Square, black, 15A (220/240V)	3105-0259
Square, black, 20A (100/120V)	3105-0258


CONTROLLER 77900
VER
HOR
DOP
CONTROL PANELS
A4
SCR GATES
A5
T/M
ANNOTATION +MARKS
A3
VCR / PHYSIO
A8
AUDIO
TO/FROM VCR
S1
FOOTSWITCH
PROCESSOR
A1
HPIB
A6
ANALOG I/O
A2
MEMORY CLOCK
VBATT 1
KOWA
THIS PERIPHERAL INTERFACED VIA CONTROLLER MOTHERBOARD
SCR VIDEO
Z AXIS/HORIZ DRIVE/PAPER SPEED
SCANNER 77100A
VIA STRIPCHART CONNECTOR ON 77100 REAR I/O
TRANSDUCERS
L
R
MUX
EEPROM
DISTRIBUTION
B15
RF
VH
FRONT END
B3/10
RF
LINE TIMER
FINE DELAY
68000
FRAME TABLE
+5V
XMIT PULSE
B1/B2 B11/12
IF
COARSE DELAY
LINE TIMER
TAP COEFF
A2/7
IF
IMAGE DETECTOR
68000
A13
TRANSDUCER SELECT
HIGH VOLTAGE (VH)
CLOCK
FRONT TGC CONTROL
RCV. APOD. CONTROL
I/Q
REAR TGC CONTROL
PV POWER SUPPLY
A9
TRANSMIT POWER SUPPLY
68000
A8
FRAME TABLE
68000
DIGITAL CONTROL 68000
B14
TAP COEFF
LINE TIMER
68000
FRAME TABLE
TGC
LINE TIMER
68000
FRAME TABLE
B13
CW
FRAME TABLE
68000
LINE TIMER
IF
DOPPLER DETECTOR
CW TRANSMIT
A12

SCAN CONVERTER 77100A




OUTPUTS AND PERIPHERALS
HINGED CONTROLLER PANEL
REAR PANEL AUX RGB OUTPUT
4 (BNC)
TO CONTROLLER VCR/PHYSIO AND AUDIO VIA MOTHERBOARD
SCR GATES TO TM PCB
J18 ON CONTROLLER MOTHER PCB
SCR VIDEO TO ANALOG I/O
TIME MOTION
BNC
VCR
MATRIX
2 (BNC)
MITSUBISHI
AQ CONTROL PANEL
CONTROL & VIDEO
C4
VIDEO I/O
TO REAR I/O VIA MOTHER PCB
TO SCAN CONVERTER MOTHER PCB
PHYSIOS
TO PVT PCB
S-VHS VIDEO + SYNC
RS232 SERIAL
COLOR CAMERA
VCR IN/OUT COMPOSITE
RGB
VCR
RS232
BNC PIGTAIL (FRAME) MITSU CONTROL
STRIP C.
IN
RGB
OUT
RGB
RS232
HPIB
77100 REAR I/O
SONY CONTROL RS232 FROM PROC. GRAPH.
PLAYBACK
COLOR CLR
C3
COLOR CLR
HPIB
PHYSIO OUT TO CONTROLLER MOTHER PCB + L/R AUDIO
RGB COLOR MONITOR 4 (BNC)
SONY PRINTER
RGB 4 (BNC)
OPTICAL DRIVE
ABLE